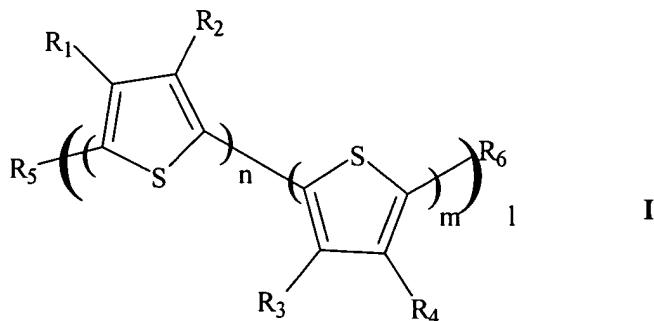


1 1. A method of detecting when an article meets or exceeds a specific temperature

2 which comprises:

3 treating at least a portion of the article with a composition comprised of a compound

4 having the following structure:



6 wherein R₁-R₆ = a hydrogen, substituted or unsubstituted alkyl radical, substituted or
7 unsubstituted alkoxy radical, substituted or unsubstituted aryl radical, substituted or
8 unsubstituted thioalkyl radical, substituted or unsubstituted trialkylsilyl radical, substituted or
9 unsubstituted acyl radical, substituted or unsubstituted ester radical, substituted or unsubstituted
10 amine radical, substituted or unsubstituted amide radical, substituted or unsubstituted heteroaryl
11 or substituted or unsubstituted aryl radical

12 n is between 1 and 1000,

13 m is between 0 and 1000, and

14 l is between 1 and 1000; and

15 a carrier medium, the compound present in the medium in an amount of about 0.05 to

16 about 5.0% by weight based on the total weight of the composition, the structure of the

17 compound designed such that when the composition is placed in a heat-exchange relationship

18 with the article, the composition will exhibit a color change when the specific temperature is

19 met or exceeded in the article; and

20 detecting when the article has met or exceeded the specific temperature.

1 2. The method of claim 1 wherein treating comprises brushing.

1 3. The method of claim 1 wherein treating comprises rolling.

1 4. The method of claim 1 wherein treating comprises spraying.

1 5. The method of claim 1 wherein treating comprises admixing the composition
2 with at least a portion of the article.

1 6. The method of claim 1 wherein treating comprises coating at least a portion of
2 the article.

1 7. The method of claim 1 wherein treating comprises coating at least a portion of
2 the article and admixing the composition with at least a portion of the article.

1 8. The method of claim 1 wherein the design temperature of the composition is
2 in the range of between – 40 to 180°C.

1 9. The method of claim 8 wherein the composition will exhibit a color change in
2 a range of plus or minus 5-10°C.

1 10. The method of claim 9 wherein the design temperature of the composition is
2 any selected temperature within the range.

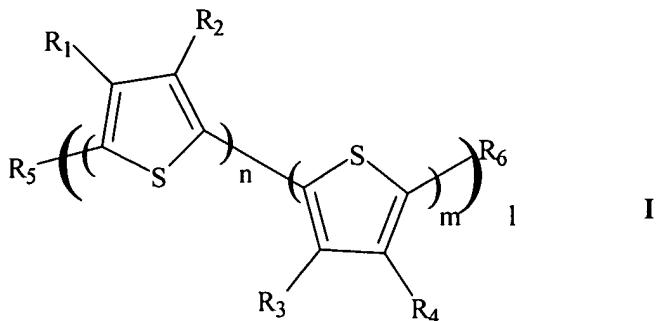
1 11. The method of claim 1 wherein the medium is selected from the group
2 consisting of polyurethanes; elastomers including polysiloxanes and polydienes; polyacrylates,
3 poly(ethylene terephthalate)s (PET), polysytrenes, polyolefins including polyethylenes (HDPE
4 and LDPE) and polypropylene, polycarbonates, polyacrylics, polyacrylic acids,
5 polyacrylamides, polymethacrylics, polyvinyl ethers, polyvinyl halides, poly(vinyl nitrile)s
6 polyvinyl esters, polyesters, polysofones, polysulfonamides, polyamides, polyimines,
7 polyimides, carbohydrates, and organic solvents including tetrahydrofuran, chloroform,
8 methylene chloride, toluene, and N-methylpyrrolidone.

1 12. The method of claim 1 wherein R₁ and R₄ are -(CH₂)₁₇CH₃, R₂, R₃, R₅, and R₆
2 are H, n is 0.8, m is 0.2, and l is between 40 and 80, the composition characterized in that a
3 low temperature color is red, a high temperature color is yellow, and the color change of the
4 composition occurs at about 60 °C.

1 13. The method of claim 1 wherein the compound is present in the medium in an
2 amount of about 0.5% by weight based on the total weight of the composition.

1 14. A thermochromic polymer-based temperature indicator composition which
2 exhibits a color change when the composition meets or exceeds a specific temperature which
3 comprises:

4 a compound comprised of the following structure:
5



6 wherein R₁– R₆ = a hydrogen, substituted or unsubstituted alkyl radical, substituted or
 7 unsubstituted alkoxy radical, substituted or unsubstituted aryl radical, substituted or
 8 unsubstituted thioalkyl radical, substituted or unsubstituted trialkylsilyl radical, substituted or
 9 unsubstituted acyl radical, substituted or unsubstituted ester radical, substituted or unsubstituted
 10 amine radical, substituted or unsubstituted amide radical, substituted or unsubstituted aryl
 11 radical or substituted or unsubstituted aryl radical,
 12

13 n is between 1 and 1000,

14 m is between 0 and 1000, and

15 l is between 1 and 1000; and

16 a carrier medium, the compound present in the medium in an amount of about 0.05 to
 17 about 5.0% by weight based on the total weight of the composition, the structure of the
 18 compound designed such that when the composition is placed in a heat-exchange relationship
 19 with an article, the composition will exhibit a color change when a design temperature or a
 20 temperature beyond the design temperature is reached in the article.

1 15. The composition of claim 14 wherein the design temperature is in the range of
 2 between about -40 to 180°C.

1 16. The composition of claim 15 wherein the composition will exhibit a color
 2 change in a range of plus or minus 5-10°C.

1 17. The composition of claim 16 wherein the design temperature is any selected
2 temperature within the range.

1 18. The composition of claim 14 wherein the composition is coated on at least a
2 portion of the surface of the article.

1 19. The composition of claim 14 wherein the composition is admixed with at least
2 a portion of the article.

1 20. The composition of claim 14 wherein the composition is coated on and
2 admixed with at least a portion of the article.

1 21. The composition of claim 14 wherein the medium is selected from the group
2 consisting of polyurethanes; elastomers including polysiloxanes and polydienes; polyacrylates,
3 poly(ethylene terephthalate)s (PET), polysytrenes, polyolefins including polyethylenes (HDPE
4 and LDPE) and polypropylene, polycarbonates, polyacrylics, polyacrylic acids,
5 polyacrylamides, polymethacrylics, polyvinyl ethers, polyvinyl halides, poly(vinyl nitrile)s
6 polyvinyl esters, polyesters, polysofones, polysulfonamides, polyamides, polyimines,
7 polyimides, carbohydrates, and organic solvents including tetrahydrofuran, chloroform,
8 methylene chloride, toluene, and N-methylpyrrolidone.

1 22. The composition of claim 14 wherein R₁ and R₄ are -(CH₂)₁₇CH₃, R₂, R₃, R₅,
2 and R₆ are H, n is 0.8, m is 0.2, and l is between 40 and 80, the composition characterized in

3 that a low temperature color is red, a high temperature color is yellow, and the color change
4 of the composition occurs at about 60 °C.

1 23. The composition of claim 14 wherein the compound is present in the medium
2 in an amount of about 0.5% by weight based on the total weight of the composition.